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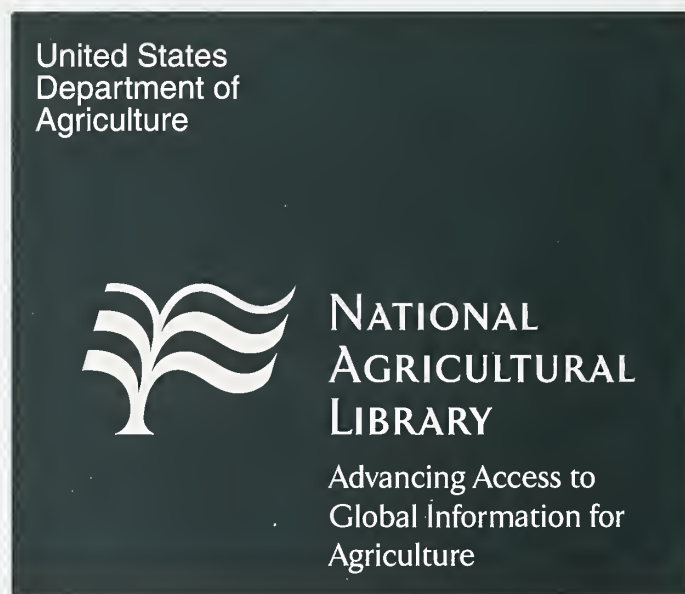
Water Quality Education and Technical Assistance Plan

1990 Update



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July 1990



Cover: Water is a national treasure. Maintaining its quality is a social responsibility.

Foreword

The American agricultural system is unparalleled in its capability to produce food and fiber. Agricultural production, by its very nature, however, involves movement of soil and water and the growing and harvesting of plant material, all of which may affect water quality and quantity. Many farmers view their role toward the natural resources they manage from the standpoint of stewardship of the land. Stewardship, however, requires knowledge about environmental problems, such as ground- and surface-water contamination, and the adoption of practices that preserve long-term soil productivity and water quality.

The effective treatment of nonpoint source ground-water and surface-water pollution in agricultural America requires the timely delivery of educational materials, conservation technology, and financial assistance. The U.S. Department of Agriculture (USDA) strongly encourages voluntary actions to improve or enhance water quality and quantity and to conserve surface and ground water. USDA has an established network of technical specialists and educators and an institutional framework to assist land users through local soil and water conservation districts and other local groups with soil and water resource problems.

USDA's Agricultural Stabilization and Conservation Service (ASCS), Extension Service (ES), and Soil Conservation

Service (SCS) have the field delivery systems and networks to meet these requirements. These agencies are staffed with professionals who are experienced in water quality and quantity resource management.

Educational, technical, and financial assistance procedures will be implemented through the ASCS-ES-SCS Education and Technical Assistance (E&TA) process as authorized by law and defined in the President's Water Quality Initiative. The principal objective of this initiative is to provide farmers, ranchers, and foresters with the educational, technical, and financial means to respond voluntarily and independently to onfarm environmental concerns and related State water quality requirements.

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Nonpoint Source Pollution of Surface- and Ground-Water Resources

For the past 25 years, the United States has carried out a comprehensive effort to improve surface-water quality. This effort has largely emphasized programs to control municipal and industrial point sources of pollution. These investments have improved water quality and associated biological productivity in many areas.

Similar investments have not been made to address the multitude of diffuse pollution sources termed collectively "non-point source pollution." Impairments to water quality due to nonpoint sources have become increasingly evident as point sources are reduced.

Nonpoint source pollution can originate from a variety of sources and activities. Natural nonpoint pollution occurs from



Water quality and quantity concerns apply to both ground water and surface water.



Integrated pest management including pest scouting and pesticide application management reduce the availability of agricultural chemicals for transport to ground- and surface-water bodies.

such processes as geologic erosion, saline seeps, and dissolution of nutrient-rich rocks and soils. Activities that contribute to nonpoint source pollution include forestry operations, mining, construction excavations, and agriculture.

In many areas, concern about agricultural nonpoint sources of pollution is focused on the potential risk from manufactured nutrient and pesticide materials. Use of modern agricultural chemicals—insecticides, fungicides, rodenticides, herbicides, and fertilizers—has increased in recent decades, enabling American farmers to increase their productivity and keep food prices low and quality high.

Chemicals, however, can move into surface waters, either attached to sediment eroded from agricultural land or dissolved in runoff, and can infiltrate the soil profile to contaminate ground-water supplies.

Presidential Water Quality Initiative and the USDA Water Quality Program Plan

President Bush recommended a new initiative for enhancing water quality in his 1990 budget proposal presented to Congress on February 9, 1989. (See table 1.) The President's initiative defines a vigorous effort to protect ground and surface water from potential contamination by

agricultural chemicals and wastes, especially pesticides and nutrients. The plan integrates the combined expertise of USDA agencies to promote the use of environmentally and economically sound farm production practices and to develop improved chemical and biological pest controls.

In his statement of principles and policies, the President makes it clear that farmers are ultimately responsible for avoiding contamination of water resulting from management



Crop rotation, terraces, and strip farming conservation practices reduce the runoff transport of nutrients and pesticides that cause impairment to lakes, streams, and ground-water recharge areas.

Table 1. Water Quality Appropriated Funding for 1990*

Activity	Participating Agency		
	ASCS (financial assistance)	ES (educational assistance)	SCS (technical assistance)
	(millions of dollars)		
Demonstration Projects	0.89	0.9	1.1
Nonpoint Source Hydrologic Unit Areas	7.0	1.7	4.6
Regional Project Initiatives	—	0.9	2.6
Water Quality Special Projects	11.9	—	—
Technology and Data Base	—	1.75	3.9

*After Gramm-Rudman-Hollings sequestration

practices they apply to the land. The statement emphasized that the role of the USDA is to conduct research and to provide education and technical assistance that helps producers fulfill their responsibilities by adopting "...farming practices that avoid water quality degradation..." and that are economically viable.

USDA has implemented a Water Quality Program Plan in support of the President's initiative. This plan includes three principal components: Education and Technical Assistance, Research and Development, and Data Base Development and Evaluation.

Educational, Financial, and Technical Assistance

Educational, financial, and technical assistance will be provided to farmers, ranchers, and foresters in applying new and improved agrichemical and animal waste management practices. This assistance will be based on available research results and new techniques, practices, and systems provided through research and development.

A principal program objective will be to adopt water quality practices to reduce or prevent contamination of ground or surface water by agricultural nonpoint sources where it has been identified as a public concern. Demonstration projects will be established in some of these areas to facilitate the adoption of water quality practices. Educational, technical, and financial assistance will be provided in hydrologic unit areas to remedy identified water quality problems. This assistance will help meet State water quality requirements and specific water quality goals of regional water quality projects. Particular emphasis will be placed on agricultural nonpoint sources of ground-water pollution.

Goals and Objectives of the Plan

Goal:

To provide the agricultural community with the necessary educational, financial, and technical assistance required to restore agriculturally impaired water resources, to prevent additional future impairment, and to evaluate the effects of these activities on ground-water and surface-water resources.

Objectives:

- Select, plan, and implement 24 USDA water quality demonstration projects to show locally the effectiveness of selected management practices in relieving conditions of impaired water quality.

- Select, plan, and implement 275 nonpoint source hydrologic unit areas to restore water quality where agriculturally related water quality impairment has been identified or to reduce the potential for additional areas to become impaired.

- Accelerate educational, financial, and technical assistance to support the agricultural elements of regional water quality initiatives, including but not limited to ongoing efforts to protect the Gulf of Mexico, the Great Lakes, Chesapeake Bay, and Puget Sound.

Goal:

Implement a coordinated technology development and application process for water quality management practices to support ASCS, ES, and SCS field staff operations.

Objectives:

- Revise field office technical guides and adopt policies that support field water quality activities.
- Develop and implement water quality management practices as specific water quality needs are identified.
- Develop and expand geographic information systems (GIS) to meet the complex geotechnical information management requirements imposed by water quality activities for ground and surface water.
- Expand the application of the National Soils and Pesticide Data Base to better support the water quality effort.

Goal:

Provide the necessary financial assistance to support the accelerated selection and application of water quality improvement practices.

Objective:

- Establish appropriate cost-share procedures for installing practices.

Responsibility for the Education and Technical Assistance activities rests upon the USDA agencies that have major field-delivery capabilities. ASCS will accelerate the installation of conservation practices that improve water quality through financial assistance and local conservation coordination. ES will provide information and educational programs that address the selection and application of agricultural chemicals and will transfer related research findings to field users. SCS will provide technical assistance for project planning and the development, installation, and evaluation of conservation practices for improving and protecting water quality.

Table 2. Water Resource Treatment Objectives for 1990 Projects and Areas

Principal water resource concern			Polluting agents				
Demonstration projects	Ground water	Surface water	Pesticides	Nutrients	Animal waste	Mineral salts & elements	Sediment
California		●	●				
Florida	●	●	●	●			
Maryland	●	●	●	●	●		●
Minnesota	●		●	●			
Nebraska	●		●	●			
North Carolina		●	●		●		●
Texas	●		●		●		
Wisconsin	●	●	●	●			
Nonpoint source hydrologic unit areas							
Alabama	●	●	●		●		●
Arizona	●			●			
Arkansas	●	●		●	●		
California	●		●	●		●	
Delaware	●	●	●	●	●		●
Connecticut	●	●	●	●	●		●
Florida	●	●		●			
Illinois	●		●	●			
Indiana	●	●	●	●			●
Iowa	●	●	●	●			●
Maine		●		●			●
Massachusetts		●	●	●	●		
Michigan	●	●	●				●
Minnesota	●		●	●			
Mississippi		●	●	●	●		●
Montana		●		●	●		●
Nebraska		●					●

Table 2. Water Resource Treatment Objectives for 1990 Projects and Areas—Continued

Principal water resource concern			Polluting agents				
Nonpoint source hydrologic unit areas	Ground water	Surface water	Pesticides	Nutrients	Animal waste	Mineral salts & elements	Sediment
New Hampshire	●	●	●	●	●		●
New Mexico	●	●	●		●	●	●
New York	●			●			●
North Carolina	●	●		●			●
North Dakota		●		●			●
Ohio		●					●
Oklahoma		●		●			
Oregon	●	●	●	●			●
Puerto Rico		●	●		●		●
Rhode Island	●	●	●	●			●
South Carolina		●	●	●	●		●
South Dakota		●		●			●
Tennessee	●	●	●	●	●		●
Texas		●	●	●	●		
Utah		●		●			●
Vermont	●	●	●	●			●
West Virginia	●	●	●	●	●		●
Wisconsin	●		●	●			
Wyoming		●	●	●			●

Nonpoint Source Hydrologic Unit Areas

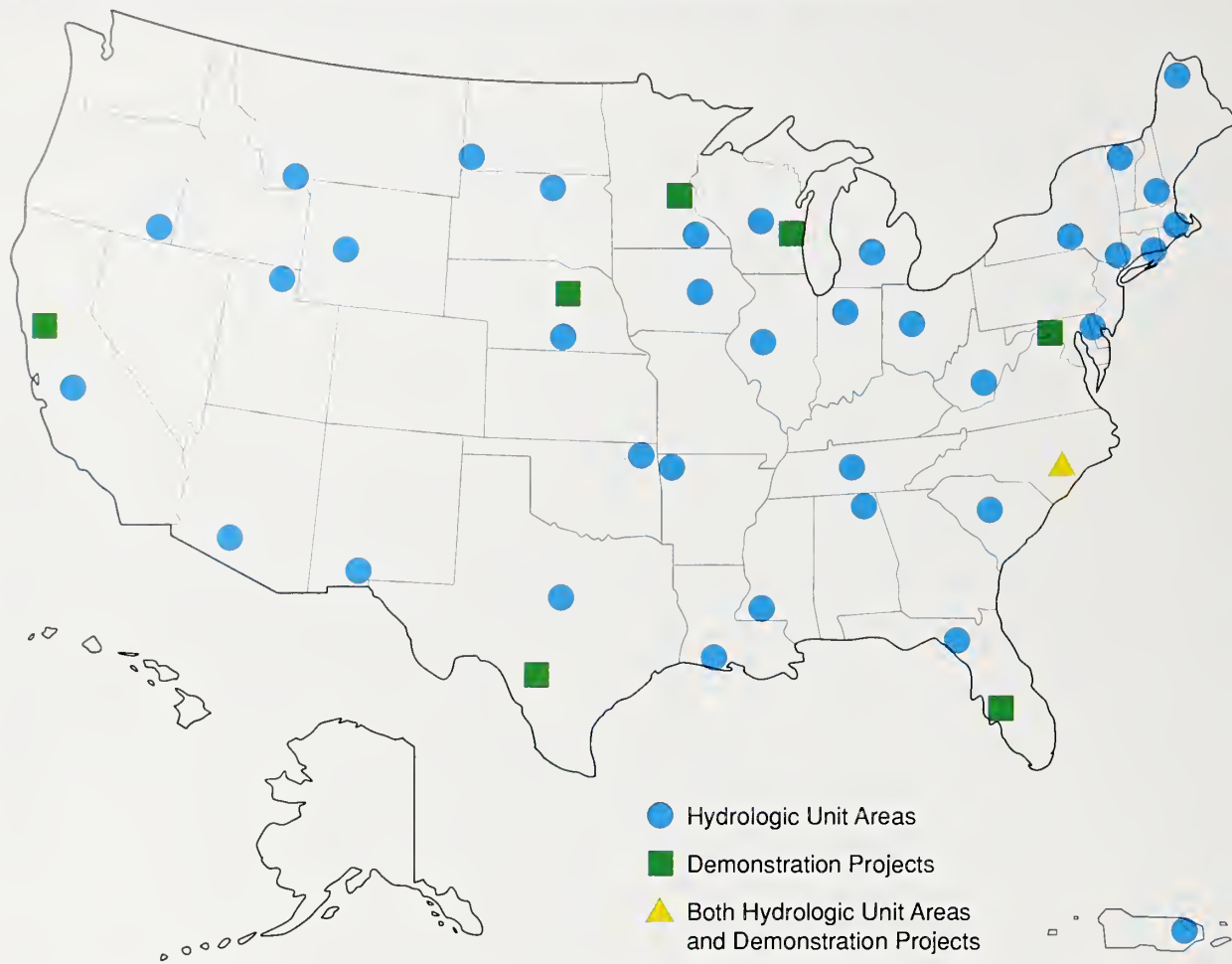
In selected agricultural watershed or aquifer-recharge areas, called "nonpoint source hydrologic unit areas," SCS, ES, and cooperating agencies will provide conservation planning and technical assistance that will help farmers and ranchers to meet State water quality goals without undue economic hardship. ASCS will provide financial assistance to producers for installing water quality practices in most areas.

Hydrologic units will be selected in areas where impairment of water quality by agricultural nonpoint sources is significant. In selecting these areas, the State assessment and management

reports developed under section 319 of the Water Quality Act of 1987 and other water quality data will be used in consultation with appropriate State agencies and organizations. Selection will be on the basis of (1) significance of the agricultural sources of pollution; (2) relative predominance of such designated pollutants as pesticides, nutrients, and animal wastes; and (3) conformance with other water quality efforts.

Hydrologic unit planning and treatment will be a coordinated effort by Federal, State, and local agencies and will include public involvement. Progress will be monitored to determine the effects of water quality measures on the water quality

FY-1990 Demonstration Projects and Nonpoint Source Hydrologic Unit Areas





Nutrient management practices balance plant needs with natural and applied nutrients and rainfall patterns to reduce contamination of water resources.

problems. The information gathered will provide a basis for expanding application to other areas with similar water quality problems.

The 5-year action plan of the USDA water quality initiative includes an implementation schedule for 275 hydrologic unit areas. Thirty-seven units were initiated in fiscal year 1990. (See map.) Each project will continue for 3 to 5 years, depending on project complexity, and will generally entail the following:

- Start-up (year 1)
- Implementation of conservation practices (years 1-3)
- Technology transfer (years 2-5)
- Progress assessment (years 2-5)

Water Quality Demonstration Projects

The objective of these projects is to demonstrate the effectiveness of selected conservation practices in treating specific nonpoint source pollution problems and to promote the use of these practices in other areas. These projects will be implemented under the joint leadership of SCS and ES.

There will be 24 projects, representing different sets of agricultural, soil, and geological conditions. For these projects, critical nonpoint sources of contamination will be identified and specific treatment goals will be established with the landowner. These projects will utilize the newest and best information to implement cost-effective production systems

that combine efficient production with the producer's water quality goals.

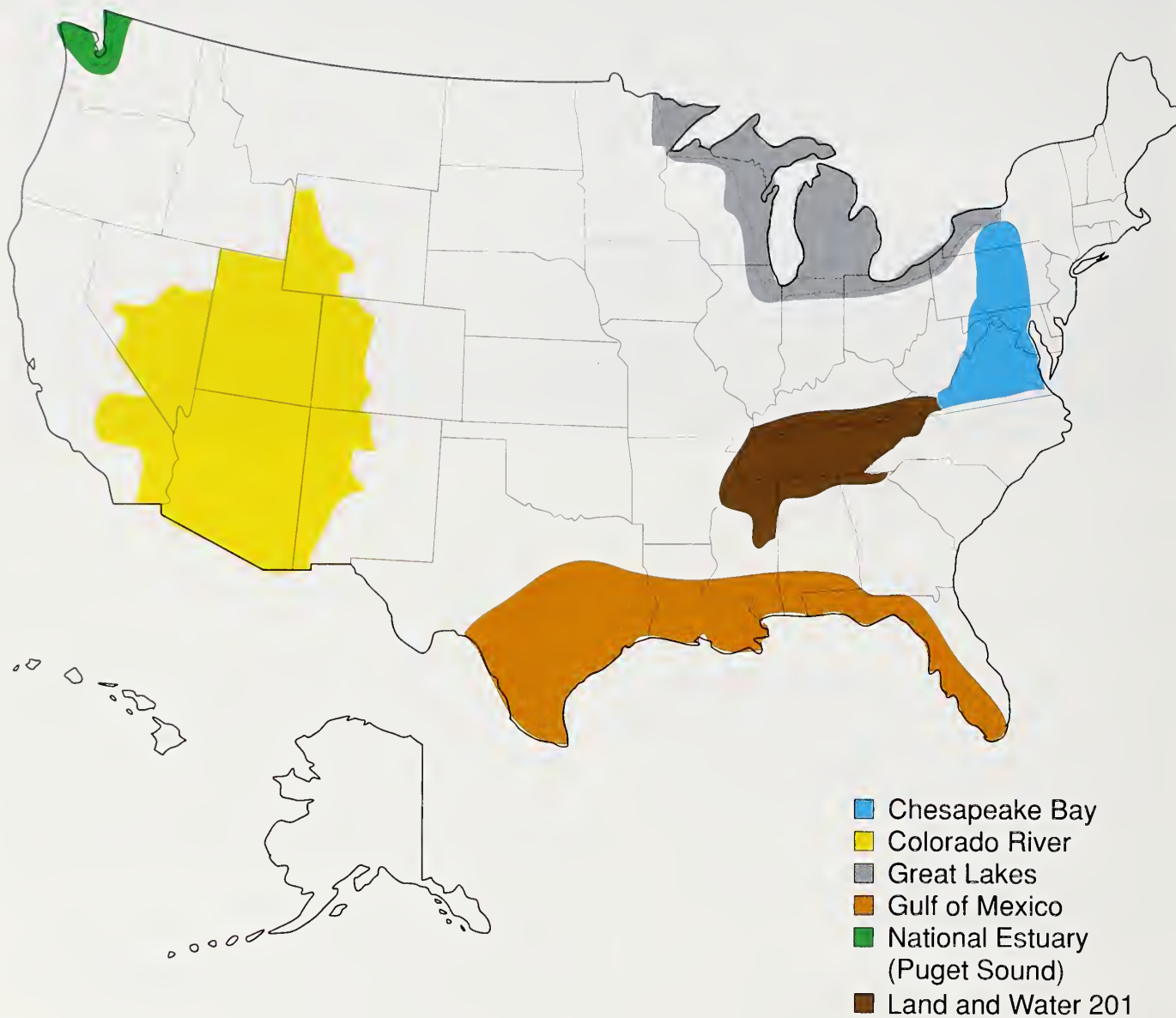
Demonstration projects will follow existing project planning guidance and will include interagency consultation and public involvement. The projects will be evaluated to determine the effects that selected practices have on the water quality problem, the extent to which improved practices are adopted, and the costs of implementing practices. Financial assistance for the demonstration projects will be provided by ASCS's Agricultural Conservation Program (ACP) and other Federal and State programs.

The 5-year action plan of the USDA water quality initiative includes an implementation schedule for 24 demonstration projects. Eight projects per year will be initiated over a 3-year period, beginning in fiscal year 1990. (See map.) Each project will continue for 5 years and will entail the following:

- Start-up (year 1)
- Implementation of conservation practices (years 1-5)
- Technology transfer by SCS, ES, and the Cooperative Extension System (years 2-5)
- Progress assessment by ASCS, SCS, and ES (years 1-5)

At least one of the demonstration projects will address problems of limited-resource, small-scale, or minority farms.

FY-1990 Regional Water Quality Initiatives



Regional Project Initiatives

SCS will accelerate current technical and information assistance to multi-State regional projects that include water quality treatment objectives. Examples are the Gulf of Mexico Program, Chesapeake Bay Program, Land and Water 201, Great Lakes National Program, and the National Estuary Program. This assistance will further the development of nonpoint source pollution management plans, including

systems of conservation practices, to meet the water quality objectives.

ES will provide educational programs that address the regional initiatives to expand effective nutrient management, integrated pest management, and pesticide selection and application. ASCS will provide cost-share assistance under current ACP procedures and will emphasize water quality improvement practices.

As with the demonstration projects and the hydrologic units, the regional project effort will draw heavily on the experiences of current water quality activities and available agricultural and economic research information. Information gathered on the effects of water quality practices will be used in other problem areas.

Agricultural Conservation Program (ACP) Water Quality Special Projects

Program funds are reserved by ASCS at the national level to fund Water Quality Special Projects developed by county Agricultural Stabilization and Conservation (ASC) committees. Project emphasis is on improving the quality of ground water and surface water that has been impaired by agricultural nonpoint sources. Various conservation measures authorized under the ACP are available to solve problems identified in the project plans. The projects are administered by ASCS with educational and technical assistance provided by ES and SCS.

Flexibility is built into the concept of Water Quality Special Projects. These projects can be used to solve problems identified in the hydrologic unit areas and demonstration projects and those identified locally that may also provide significant public benefits to nonagricultural interests. Projects may additionally be designed to support State 319 nonpoint source objectives.

Technology Development and Transfer

Technology development and transfer are crucial elements of the Department's water quality and quantity objectives. Improved technology—such as the "best management practices" shown in table 3—means better technical assistance to farmers, ranchers, and policy officials and more efficient program management. Updating and strengthening field office technical guides with the best available technical information and other educational resources is an essential part of technology development.

The primary technology objectives will be to (1) develop working procedures that evaluate the effects of agricultural activities on water quality and quantity and (2) formulate resource management systems that improve water quality. The evaluation procedures will be linked to concurrent economic evaluations. To more accurately determine the effects of agricultural contaminants and the level of remedial action required, technology for determining the sources of pollutant loads in watersheds and aquifer recharge areas will be developed through the USDA interagency research effort.



Regional project initiatives include providing education and technical assistance to projects such as the Puget Sound National Estuary where forestry and dairy operations are affecting fishery habitats.

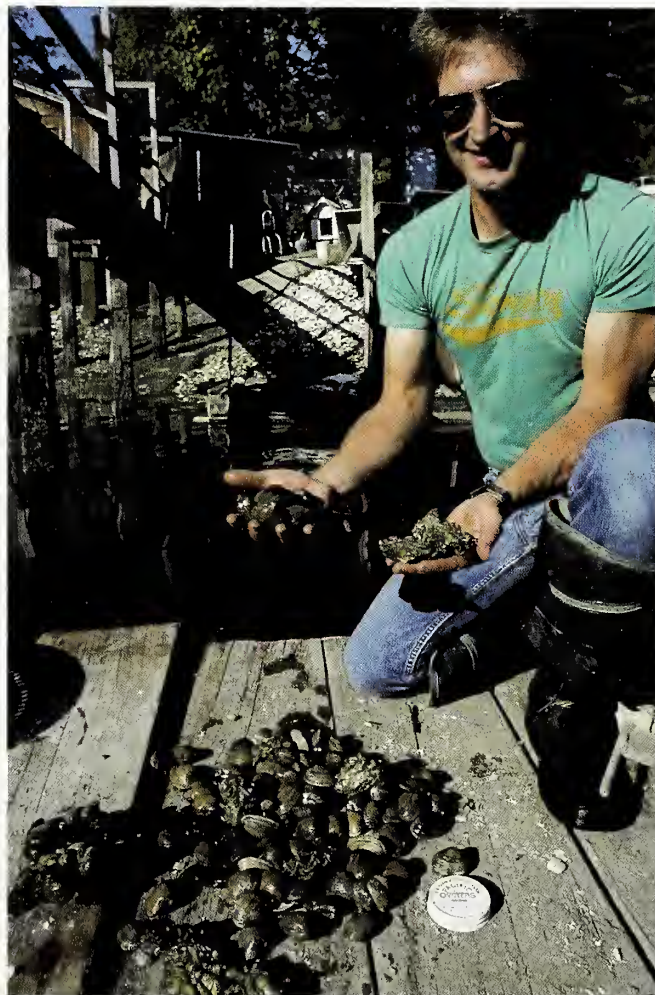


Table 3. Best Management Practice Summary Guide		Resource Concerns									Ground Water Quality	
Key		Surface Water Quality										
		Salinity	Temperature	Sediment	Soluble Nutrients	Adsorbed Nutrients	Soluble Pesticides	Adsorbed Pesticides	02-Demanding Sub's	Pathogens	Nutrients	Pest. Loss to Grd. Wtr.
I. Management Practices												
1. Nutrient Management		●	●	●	▲	▲	●	●	●	●	▲	●
2. Pest Management		●	●	●	●	●	▲	▲	●	●	●	▲
3. Irrigation System, Tailwater Recovery		▲	▲	▲	▲	▲	▲	▲	●	●	▲	▲
4. Irrigation Water Management		▲	●	▲	▲	▲	▲	▲	●	●	●	●
5. Regulating Water in Drainage Systems		●	▲	●	▲	●	▲	●	●	●	▲	▲
6. Soil Salinity Management		▲	●	●	●	●	●	●	●	●	●	●
7. Structure for Water Control		●	●	▲	●	▲	●	●	▲	●	●	●
8. Water Table Control		●	▲	●	▲	●	▲	●	●	●	▲	▲
9. Waste Management System*		●	●	▲	▲	▲	●	●	▲	▲	▲	●
10. Runoff Management System*		●	▲	▲	▲	▲	●	●	▲	▲	▲	●
II. Vegetative and Tillage Practices												
11. Conservation Tillage		●	●	▲	●	▲	●	▲	●	●	▲	▲
12. Contour Farming		●	●	▲	●	▲	●	▲	●	●	▲	▲
13. Contour Stripcropping		●	●	▲	●	▲	●	▲	●	●	●	●
14. Filter Strip		●	●	●	●	●	●	●	●	●	▲	▲
15. Field Border		●	●	●	●	●	●	●	●	●	●	●
16. Cover and Green Manure Crop		●	●	●	●	●	●	●	●	●	●	●
17. Conservation Cropping Sequence		●	●	▲	●	▲	●	▲	●	●	●	●
18. Field Windbreaks		●	●	●	●	●	●	●	●	●	●	●
19. Pasture and Hayland Management		●	●	●	●	●	●	●	●	●	●	●
20. Field Stripcropping		●	●	●	●	●	●	●	●	●	●	●
21. Grasses & Legumes in Rotation		●	●	●	●	●	●	●	●	●	●	●
III. Structural Practices												
22. Terrace		▲	▲	▲	●	▲	●	▲	●	●	▲	▲
23. Water & Sediment Control Basin		●	▲	▲	●	▲	●	▲	●	●	▲	▲
24. Diversion		●	▲	●	●	●	●	●	●	●	●	●
25. Grade Stabilization Structure		●	●	●	●	●	●	●	●	●	●	●
26. Grassed Waterway		●	●	●	●	●	●	●	●	●	●	●
27. Streambank and Shoreline Protection		●	▲	▲	●	▲	●	●	●	●	●	●
28. Wetland Development or Restoration		●	●	▲	●	▲	●	▲	▲	●	▲	●

Note: Because of the general nature of this chart, there may be situations and sites where practices will not perform as indicated.

* Includes all appropriate structural, vegetative, and management practices.

** Depends on soil, crop, practice design, and management characteristics.

A significant component of technology transfer will be the education and training of field office personnel to deliver expanded water quality programs, including the analysis of results and the refinement of technical procedures. ES and SCS will publish informational material to provide technical guidance on the environmentally responsible management of pesticides, nutrients, and waste products for use by farmers, foresters, farm advisors, agribusiness, and local, county, and State agencies. Detailed field guides and organized professional training on new concepts and technologies pertaining to agricultural chemical and waste product management and related environmental stewardship will be developed to enhance that delivery capacity.

Data Base Development

Data base development and software development to integrate National Resources Inventory (NRI) information, agrichemical data, and soil survey data are essential to the analysis of farm program policy. Enhancement of the soils data base and development of the climatological data base will support development and implementation of conservation practices to reduce agricultural nonpoint source pollution. Specific data base efforts under this 5-year plan will involve but will not be limited to:

- Soils-pesticide interaction characteristics
- NRI data
- National climatological data
- Soil survey data base for modeling
- Plant materials data base

GIS's are becoming an important resource planning tool. Federal and State resource management agencies are rapidly developing data bases to use in GIS's. The layering of data base information in a GIS provides an opportunity to rapidly evaluate different resource management scenarios.

Many Federal agencies currently have or are planning activities to compile and distribute descriptive national data sets. A few relevant examples include: the collection of data on soil properties through SCS and the National Cooperative Soil Survey Program; the National Oceanic and Atmospheric Administration's (NOAA) extensive records of weather and climate data; the Environmental Protection Agency's (EPA) national well water survey; the U.S. Geological Survey's (USGS) compilation of the characteristics of the Nation's hydrologic systems; and ASCS farm and program participation records and the Conservation Reporting and Evaluation System (CRES).

The Education and Technical Assistance data base activities will be coordinated with the efforts of USDA's Economic Research Service (ERS) and National Agricultural Statistics Service (NASS). A digitized GIS for agriculture and water quality will be developed to link nationwide data and statistical information on agricultural productivity, land use, agrichemical use, physical attributes of the land and surrounding watersheds, climate, and water quality. The data will be used to support a variety of policy and program decisions by a number of Federal and State agencies.

Interagency Coordination

Coordination between agencies and organizations at all levels is essential to an effective program for reducing nonpoint source pollution. To ensure coordination, SCS and ES chair the Water Quality Education and Technical Assistance Committee, comprising some USDA agencies, EPA, USGS, NOAA, the National Association of Conservation Districts (NACD), and the National Association of State Conservation Agencies (NASCA). This committee will review and coordinate water quality objectives, the selection and implementation of hydrologic units, demonstration projects, and assessment activities.

At the local level, SCS and ES State and local offices will initiate coordination efforts with other Federal, State, and local agencies including local soil and water conservation districts and with appropriate conservation organizations. The 1890 land-grant universities and Tuskegee University will be invited to cooperate in determining the effects of water quality conditions and programs on limited-resource, small-scale, and minority farms.

Water Quality Activity Assessment

Onfarm Assessments—Onfarm assessments of water quality practice effects or resource management plans will include such values as reduction in nutrients and chemicals applied, reduction in irrigation tailwater discharge and deep percolation, volume of animal waste managed, and soil erosion reduced. Additional onfarm assessments will include the extent to which management plans are installed for such items as fertilizers, pesticides, animal waste, farmstead chemicals and fuels, and irrigation water.

Onfarm assessments will be made by SCS and ES using practice reporting systems, field staff interviews, and voluntary operator reporting. Limited onfarm measurements will be made of surface- and ground-water chemistry.



Irrigation water management is a vital water quality practice that reduces the potential to transport pesticides and nutrients through the root zone to the ground-water resource.

Area and Regional Assessments—Area and regional assessments will be conducted by such agencies as USGS, EPA, ERS, or by an appropriate State agency. Such assessments would include surface- and ground-water monitoring, levels of pesticide and nutrient use, and the economic effects of impairment and treatment. The educational and technical support of these efforts will be provided by ES and SCS as appropriate.

The Water Quality Information Effort

ASCS, ES, and SCS will provide information about the progress of their operations to benefit water quality and quantity. They will:

- Tell how USDA and farmers and ranchers are working to improve water quality.
- Provide field offices with examples of successes in reducing water quality problems.
- Promote voluntary action in the agricultural community.

- Encourage agencies, universities, farm organizations, farmers and ranchers, and urban dwellers to work together to develop local solutions where local water quality problems exist.
- Explain the overall urban-rural-agricultural water quality situation.

The National Role in Public Information

The information effort will be conducted in phases. Phase one was implemented in fiscal year 1989 within USDA and associated organizations. It included the following projects:

- Newsletters and educational and technical releases for ASCS, ES, and SCS field personnel.
- Information materials that address the purpose and use of water quality practices.
- Interagency workshops to explain the USDA Water Quality Program Plan.
- Water quality exhibits.

Phase two will inform farmers and ranchers of economical and practical ways to protect and improve surface and ground water and prevent further contamination from agricultural nonpoint sources.

The State Role in Public Information

The State information effort is key to the success of water quality and quantity operations. Many of the public information activities mentioned are being addressed in the States. The States are expected to continue their public information efforts, tailoring them to local concerns, treatment activities, and water quality effects.

New Directions and Partnerships

It is clear from the preceding sections that no single planned product from the USDA Water Quality Program is to be produced through the exclusive efforts of a single agency; all are multiagency activities. Also, many of the program's major activities contribute to more than one set of planned products. These activities are coordinated by a network of interagency committees. Many of these committees are in place, and others are currently being formed.

USDA Water Quality Program activities are closely coordinated among USDA agencies and with the related activities of EPA and agencies of the Departments of Interior and Commerce under the President's Water Quality Initiative. USDA recognizes that maintaining and improving water quality is a State responsibility and will assist States in implementing the nonpoint source management program required under the Water Quality Act of 1987. The USDA Water Quality Program will benefit from related past and current departmental efforts in soil and water conservation, public information, research, and extension. It will complement the aims of established programs, such as those addressing integrated pest management and sustainable and alternative agricultural systems.

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